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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,038	10/13/2004	Hiroyuki Matsuura	259942US2PCT	6481

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EXAMINER	
LAFOND, RONALD D	
ART UNIT	**PAPER NUMBER**
1709	

NOTIFICATION DATE	DELIVERY MODE
08/09/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/511,038	MATSUURA ET AL.	
	Examiner	Art Unit	
	Ronald D. Lafond	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/13/2004, 03/08/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Preliminary Amendment of October 13, 2004, which is the filing date of this Application, was received and has been entered. Claim 9 has been amended and Claims 10 and 11 have been added.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 4 – 6 and 9 – 11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

4. Regarding Claims 4 – 6, these Claims are directed towards a method of deriving an equation from data. Equations are a form of abstract idea that comprise one of the three judicial exceptions to Patent Eligible subject matter as defined by the Courts (see MPEP 2106). Because the methods of these Claims do not either transform an article or physical object to a different state or thing or otherwise produce a tangible result, these methods have no practical application and are thus non-statutory subject matter (see MPEP 2106.02).

5. Regarding Claims 9 – 11, these Claims are directed towards media storing computer programs that cause a computer to execute the equation derivation methods of Claims 4 – 6, respectively. However, because these programs do not impart functionality when employed as a computer component, i.e. no physical transformation or tangible result is produced, the media storing these programs do not produce a practical application and are therefore nonfunctional descriptive materials that constitute non-statutory subject matter (see MPEP 2106.01).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 – 6 and 9 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toki, et al. (Japanese Patent JP 4-125947 A, hereafter Toki) in view of Watabe, et al. (Japanese Patent JP 5-032500, hereafter Watabe).

8. Regarding Claim 1, Toki teaches a film formation method comprising a preparation stage and a process stage, the preparation stage comprising a first film formation step of forming films, while using different process times, a first measurement step of measuring film thickness of the films formed in the first film formation step, a first derivation step of deriving, based on measured data obtained in the first measurement step, a first relational equation that expresses a relationship between film thickness and process time, and the process stage comprising a correction step of correcting process time, based on a measurement result, and a film formation step of forming a film, based on process time corrected in the correction step (see Abstract and Figures 1 – 4).

9. Toki does not explicitly teach a preparation step comprising a second film formation step of forming films, while controlling process gas pressure with reference to different values of atmospheric pressure, a second measurement step of measuring film thickness of the films formed in the second film formation step, a second derivation step of deriving, based on measured data obtained in the second measurement step, a second relational equation that expresses a relationship between atmospheric pressure and film thickness, and a third derivation step of deriving, based on the first and second relational equations derived in the first and second derivation steps, a process time correction equation prepared to correct process time in accordance with atmospheric pressure fluctuations. However, it should be noted that Toki implicitly teaches any method wherein a film formation step is used to derive a relational equation between any two process parameters controllable by valves – that is, based upon

Figures 1 – 4, and especially Figure 1, Box S4, Toki teaches that any parameter may be correlated to any evaluation criteria, which may itself be compared to a desired criterion value. Because control valves are the tools used to set these values, one skilled in the art would realize that process flow rates and pressures are two parameters that might obviously be varied to optimize a film formation process. Regardless, Watabe teaches that "the thickness of the ... film is found to vary with change of atmospheric pressure when ... time and gas flow rate are constant. Atmospheric pressure during the treatment is converted into amounts changed of the ... time and the gas flow rate by correlation between atmospheric pressure and film thickness by an electronic computer and the treating condition is regulated by a control device." That is, Watabe teaches that it is known in the art to correlate pressure to film thickness and further to control pressure, and further to measure differences between these values to derive a relational equation between the two to achieve a desired thickness. Furthermore, as discussed, Toki teaches that the processing time may be related mathematically to any chosen process parameter. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Toki by deriving a relational equation between pressure and film thickness as taught by Watabe to further derive a relational equation between process time and pressure to have predictably and successfully achieved the film formation method taught by Watabe with a reasonable expectation of success.

10. Toki in view of Watabe does not explicitly teach a process stage comprising a correction step of correcting process time, based on a measurement result of current atmospheric pressure and the process time correction equation derived in the third derivation step, and a film formation step of forming a film, while controlling process gas pressure with reference to atmospheric pressure, based on process time corrected in the correction step. However, as discussed, Toki does teach a process time correction function generally (see especially Figure 4, which refers to criterion film formation speed, criterion values of evaluation, and criterion tolerance ranges of evaluation for any process parameter P). Furthermore, the Examiner takes Official Notice that it is well known in the art of statistical design of experiments to not only combine variables that are known to be correlated in order to simplify design/control of experiments, but also to account for the synergistic or antagonistic effects of the variables with one another. Therefore,

it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Toki in view of Watabe by employing a correction step based on the relational equation previously derived between pressure and process time to have successfully formed the film produced in the film formation step with a reasonable expectation of success.

11. Regarding Claim 2, Toki in view of Watabe inherently teaches the method according to Claim 1, wherein the third derivation step comprises a relational equation derivation step of deriving, based on the first and second relational equations, a third relational equation that expresses a relationship between atmospheric pressure and process time, and a correction equation derivation step of deriving the process time correction equation, based on the third relational equation derived in the relational equation derivation step.

12. Regarding Claim 3, Toki teaches the method wherein the first relational equation is formed of a linear approximation equation (see Figure 1, Box S4).

13. Regarding Claims 4 – 6, these Claims are rejected for substantially the same reasons used to reject Claims 1 – 3, respectively.

14. Regarding Claims 9 – 11, the Examiner takes Official Notice that it is well known in the art to execute algorithms via computer programs and to store such programs on appropriate media such that they may be executed by a computer. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have encoded the algorithms of the methods of Claims 4 – 6 as taught by Toki in view of Watabe and to store these programs on computer-executable media with a reasonable expectation of success, because it is well known in the art to do so.

15. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemelson (United States Patent 5,871,805) in view of Toki and Watabe.

16. Regarding Claim 7, Lemelson teaches a film formation apparatus comprising: a process chamber configured to place a substrate therein; a gas supply system configured to supply a reactive gas into the process chamber; an atmospheric measuring device configured to measure atmospheric pressure; and a control section configured to control the gas supply system (see Figure 1, and Column 5, lines 22 – 65, and Column 7, lines 26 – 40). Lemelson does not teach a storage section configured to store a process

time correction equation prepared to correct process time in accordance with atmospheric pressure fluctuations; a process time correction section configured to correct process time, based on the process time correction equation stored in the storage section; and a control section configured to control the gas supply system based on a measurement result obtained by the atmospheric pressure measuring device and process time corrected by the process time correction section. However, Lemelson does teach a computer that is used generally to control desired process parameters to optimize a desired output (e.g. film thickness) based upon measured variables (see Column 7, lines 46 – 67, and Column 8, lines 1 – 24). Furthermore, as discussed, Toki in view of Watabe teaches the derivation of a process time correction equation prepared to correct process time in accordance with atmospheric pressure fluctuations. Therefore, it would have been obvious to one having ordinary skill in the art to have modified the apparatus taught by Lemelson by employing the computer of Lemelson to derive and implement the relational equations and time correction steps taught by Toki in view of Watabe to have successfully achieved the optimized film taught by Lemelson, Toki, and Watabe with a reasonable expectation of success.

17. Regarding Claim 8, Lemelson in view of Toki and Watabe does not explicitly teach the apparatus wherein the storage section stores a plurality of the process time correction equations prepared respectively for a plurality of film formation process conditions, and the film formation apparatus further comprises a correction equation choosing section configured to choose a process time correction equation from the plurality of process time correction equations, which corresponds to a predetermined film formation process condition. However, as discussed, Lemelson teaches a computer to calculate relationships and to control process parameters to achieve an optimized film. Furthermore, Toki teaches the evaluation and storage of a plurality of process time correction equations prepared for a plurality of film formation process conditions, and the use of various recipes (see Figures 1 – 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the apparatus taught by Lemelson in view of Toki and Watabe by storing a plurality of process time correction equations for a plurality of film formation process conditions and by configuring the computer to allow for a particular set of parameters to be accessed and utilized for a chosen set of

conditions with a reasonable expectation of success, because it is known in the art to change process parameters to achieve different film properties.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D. Lafond whose telephone number is (571) 270-1878. The examiner can normally be reached on M-F 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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